WHAT IS CLAIMED IS:

1. A stereoscopic image display method for permitting an observer to stereoscopically observe image information displayed on an image display element by dividing each of parallax images corresponding to a plurality of different view points, into predetermined stripe images, synthesizing a synthetic parallax image from the stripe images, guiding display light from stripe images corresponding to one view point in the synthetic parallax image on the image display element displaying the synthetic parallax image, to a mask member having a mask pattern with predetermined openings and shields by a second optical system placed in front of the image display element, and converging display light passing through the openings of the mask member to a position corresponding to the view point on an observation surface a predetermined distance apart, by a first optical system.

2. The stereoscopic image display method according to Claim 1, wherein among image display light from pixels forming each stripe image, display light reaching a position of an observer's view point corresponding to the stripe image is condensed to the mask member by the second optical system so as to pass through the openings of the mask member and the other light is intercepted by the shields.

3. The stereoscopic image display method according to Claim 1, wherein said second optical system forms images of pixels of said image display element on said mask member in the vertical direction and a position of a focal point thereof is approximately coincident with a position of the mask member in the horizontal direction.

4. The stereoscopic image display method according to Claim 1, wherein N view points (N is an integer not less than 2) are arranged at equal intervals on the observation surface the predetermined distance apart.

5. The stereoscopic image display method according to Claim 4, wherein said first optical system and second optical system have predetermined periodic structure in the horizontal direction and the second optical system or/and the image display element are placed on intersecting planes of many straight lines connecting two adjacent view points out of the N view points arranged at the equal intervals in the horizontal direction and a horizontal center of each elementary optical element forming the second optical system.

6. The stereoscopic image display method

according to Claim 1, wherein said second optical system has predetermined periodic structure in each of the horizontal and vertical directions and an elementary optical element forming one period in the horizontal and vertical directions has optical action in the horizontal direction and optical action in the vertical direction different from each other.

7. The stereoscopic image display method according to Claim 1, wherein intersecting points of many straight lines connecting two adjacent view points out of the N view points arranged at the equal intervals and a horizontal center of each elementary optical element forming said second optical system agree with horizontal centers of the respective elementary optical elements forming the second optical system or/and agree with horizontal centers of pixels forming the image display element.

8. The stereoscopic image display method according to Claim 1, wherein the following relations are met:

$$Nd*HL1/E = Lhd/(Lhd + Lh0) \quad (h1)$$

$$Hd/HL1 = (Lh0 + Lhd)/Lh0 \quad (h2)$$

$$NL2*HL1/E = LhL2/(LhL2 + Lh0) \quad (h3)$$

$$HL2/HL1 = (Lh0 + LhL2)/Lh0 \quad (h4)$$

$$H1/E = Lh1/(Lh1 + Lh0) \quad (h5)$$

$$H1/HL1 = (Lh0 + Lh1)/Lh0 \quad (h6)$$

$$H1*Lh1a/Lh1 = HL1*Lh1b/Lh1 \quad (h7)$$

$$Lh1a + Lh1b = Lh1 \quad (h8)$$

$$Hm/H1 = Lh1a/Lh1 \quad (h9)$$

where N view points (N is an integer not less than 2) are arranged at equal intervals E on the observation surface the predetermined distance apart, HL1 is a horizontal period of elementary optical elements forming said first optical system, Hm a horizontal width of the openings of said mask member, HL2 a horizontal period of elementary optical elements forming said second optical system, Hd a horizontal pixel pitch of the image display element, LhL2 and Lhd an optical reduced distance between the first optical system and the second optical system and an optical reduced distance between the first optical system and the image display element, respectively, Lh0 an optical reduced distance from the observation surface to the first optical system, Lh1 an optical reduced distance from the first intersecting plane, when counted from the first optical system toward the image display element, out of intersecting planes of line groups connecting two adjacent view points out of the N view points and each pixel of the image display element, to the first optical system, Lh1a and Lh1b an optical reduced distance from the first optical system to the mask member and an optical reduced distance from the

mask member to the first intersecting plane from the
first optical system out of the intersecting planes,
and Nd and NL2 integers not less than 2 (Nd > NL2).

9. The stereoscopic image display method
according to Claim 1, wherein relations of Eq. (V1N) to
Eq. (V3N) or relations of Eq. (V1N) to Eq. (V4N) below
are met:

$$Vd:Vm = LV1:LV2 \qquad (V1N)$$

$$2 \cdot N \cdot Vd:VL = LV1+LV2 : LV2 \qquad (V2N)$$

$$1/LV1 + 1/LV2 = 1/fV \qquad (V3N)$$

$$N \cdot Vd:VL = LV0+LV1+LV2 : LV0+LV2 \quad (V4N)$$

where Vd is a vertical pixel pitch of said image
display element, Vm a vertical width of the openings or
the shields of the mask pattern of said mask member,
LV1 an optical reduced distance from the image display
element to a surface of the second optical system
having optical action in the vertical direction, LV2 an
optical reduced distance from the surface of the second
optical system having the optical action in the
vertical direction to the mask pattern, fV a vertical
focal length of individual elementary optical elements
forming the second optical system, LV0 an optical
reduced distance between the mask pattern and the
observation surface, and N the number of view points (N
is an integer not less than 3).

10. The stereoscopic image display method according to Claim 1, wherein relations of Eq. (V1) to Eq. (V3) or relations of Eq. (V1) to Eq. (V4) below are met:

$$Vd:Vm = LV1:LV2 \qquad (V1)$$

$$2 \cdot Vd:VL = LV1+LV2 : LV2 \qquad (V2)$$

$$1/LV1 + 1/LV2 = 1/fV \qquad (V3)$$

$$Vd:VL = LV0+LV1+LV2 : LV0+LV2 \quad (V4)$$

where said number of view points is 2, Vd is a vertical pixel pitch of said image display element, Vm a vertical width of the openings or the shields of the mask pattern of said mask member, $LV1$ an optical reduced distance from said image display element to a surface of said second optical system having optical action in the vertical direction, $LV2$ an optical reduced distance from the surface of the second optical system having the optical action in the vertical direction to the mask pattern, fV a vertical focal length of individual elementary optical elements forming the second optical system, and $LV0$ an optical reduced distance between the mask pattern and the observation surface.

11. The stereoscopic image display method according to Claim 1, wherein said first and second optical systems comprise microlens arrays.

12. The stereoscopic image display method according to Claim 1, wherein said first and second optical systems comprise lenticular lenses.

5   13. The stereoscopic image display method according to Claim 1, wherein said second optical system is comprised of a lenticular lens in which cylindrical lenses being long in the vertical direction and having an optical power only in the horizontal

10   direction are arranged at predetermined intervals in the horizontal direction and a lenticular lens in which cylindrical lenses being long in the horizontal direction and having an optical power only in the vertical direction are arranged at predetermined

15   intervals in the vertical direction.

14. The stereoscopic image display method according to Claim 1, wherein said second optical system is a microlens array in which toroidal lenses

20   having a focal length in the vertical direction and a focal length in the horizontal direction different from each other are arranged in a predetermined period in the horizontal direction and in a predetermined period in the vertical direction.

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15. A stereoscopic image display method with an image display element and a mask member having a mask

pattern with predetermined openings and shields, wherein directing of image display light from said image display element is effected by a first optical system and a second optical system placed before and

5   after said mask pattern.

16.   A stereoscopic image apparatus using the stereoscopic image display method as set forth in either one of Claims 1 to 15.